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REMARKS

In response to the Final Office Action mailed on January 30, 2006, Applicants respectfully request reconsideration. To further the prosecution of this Application, Applicants submit the following remarks discussing patentability of rejected claims. Applicants respectfully request allowance.

Claims 1-5, 10-14, and 18-23 were previously pending in the subject Application. Applicant attempted to add claims 24-36 in the reply to the previous office action reply submitted on October 12, 2005

The following remarks address the rejections of claims 1-5, 10-14, and 18-23 as set out in the Final Office Action. Applicant is appreciative of the Examiner's careful review of the claims and respectfully requests further consideration.

Applicant encourages the Examiner to call the undersigned Attorney for any reason if the Examiner feels it would be helpful to expedite prosecution of the present claims.

Claims 7-9 and 16-17

Applicant is appreciative of the allowance of claims 7-9 and 16-17.

Summary of an Embodiment of the Invention

Prior to discussion of the pending claims, Applicants would like to briefly discuss an illustrative embodiment of the present invention. One embodiment of the present invention uses a new method called replica routing to automatically direct a client computer to a replica server based on the location of the client computer in a network. More particularly, a client computer sends a request over a network. A replica router intercepts the request rather than forwards the request to the originally intended recipient. The replica router "transparently" redirects the requesting client to a replica

server that can perform well given the client's location in the network and a respective estimated performance.

Rejections of Claims under 35 U.S.C. § 102(e)

The Examiner has maintained her rejection of claim 1 under 35 U.S.C. § 102(e) based on the teachings of Wallis, et al., (U.S. Patent 6,282,569). Applicants are appreciative of the Examiner's review of pending claim 1, but respectfully traverse the rejection because claim 1 recites a technique not taught or suggested by Wallis. For example, claim 1 recites a replica router including a process that is configured to:

receive a network request for access from a client computer;  
calculate a performance metric value for each of at least two server replicas, the value specifying an estimated communication performance between the client computer and a server replica based upon the client computer's location in a network; and

direct the client computer to at least one server replica that is estimated to provide good performance based upon the client computer's location in the network based on the performance metric values of the server replicas as calculated by the replica router.

Applicant argued in the last office action that Wallis does not disclose taking into account the location of different servers in a network to determine which of multiple servers would provide a best communication performance with a respective client. In other words, claim 1 recites that the replica router is configured to calculate communication performance metric values specifying a respective ability for the replica servers to communicate with the requesting client based on the client computer's location in a network. The final office action states that Wallis discloses such a limitation at column 1, lines 14-18, which reads as follows:

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The data processing system, the client computer, and the server computers are all resident on a network. This network need not be one physical network such as a Local Area Network (LAN); for instance it may consist of a number of LANS or WANS (wide area networks) connected together (eg. via 'bridges') to form a single logical network.  
(emphasis added by Applicant)

Applicant respectfully submits that mere recitation that "server computers all reside in a network" does not disclose or suggest the claim limitation of calculating a performance metric value (for each of at least two server replicas) specifying an estimated communication performance between the client computer and a server replica based upon the client computer's location in a network. More specifically, this cited passage makes no reference whatsoever to a location associated with the client computer. For example, the passage only indicates that the client resides in a network along with the server computers. Additionally, there is no mention in this cited passage that a process calculates an estimated performance metric between the client and a server based on the client computer's location in a network. Therefore, this passage does not teach the claimed invention.

To reject the claimed invention, the Examiner further cites Wallis at column 3 lines 18-25, which reads as follows:

Any manner of predetermined test criteria can be used in the data processing system of the invention, for example the amount of idle processor time, the number of processes running, the amount of free memory, the "load average", etc. However in preferred embodiments the predetermined test criteria are such that the decision logic identifies the server computer having the least number of client programs logged on to it. (emphasis added)

Applicant respectfully submits that this passage also does not teach or suggest the invention. For example, the above listing of parameters in Wallis makes no mention of

the location of the client computer making the network request. In fact, all of the underlined parameters (e.g., amount of idle processor time, number of processes running, etc.) in the above passage in Wallis have nothing to with the location of the requesting client computer. They are all parameters associated with the servers themselves. In other words, selection of a server in Wallis depends solely on parameters associated with a respective server candidate and not external parameters associated with an entity such as the requesting client and/or network infrastructure supporting communications between the server and the client (e.g., claim 1 recites that the metric is estimated based on based on performance between the client and replica server). Thus, Applicant respectfully submits that Wallis does not teach or suggest every claim limitation and that the Examiner uses the claimed invention as a blueprint for purposes of rejecting claim 1. Applicant respectfully requests withdrawal of the rejection.

Applicant respectfully submits that Wallis recites at column 7, lines 22-50 a particular technique of determining which of multiple servers shall service a respective request:

The ULL application consists of the following elements from FIG. 1: the decision logic 120 with child processes 130, 140, 150; the writing means 160; and the messaging means 170. As described earlier with reference to FIG. 1 the ULL application periodically (at a frequency which can varied (eg. tuned by a system administrator or dynamically adjusted)) polls the server computers in the cluster to determine how "busy" in some sense they are. The metric used may vary, depending on the type of work which is being handled by the cluster, but may for example include the number of login sessions, number of application instances running, number of idle cpu cycles since the last poll, etc. The metric can be altered to ensure that it is appropriate to a specific situation.

Based on the results of this polling, and taking into account the situation where a server computer in the cluster is too busy to respond to the status request within a certain

number of seconds, the ULL application decides which machine is currently the least heavily loaded. The ULL application then modifies the database file (named.data) to associate the generic cluster machine name with the Internet address of this least heavily loaded machine, and sends the special inter-process signal via the messaging means 170 which tells the nameserver application to re-read its database file. The nameserver application will then, in response to a name resolution request from a client program, resolve the generic server computer name into the Internet address of the most appropriate server computer in the cluster for the client program to connect to. (emphasis added)

Accordingly, the prior art teaches a method of load-balancing based on whether a respective server has the most free resources to service a request.

In contradistinction to this above technique in Wallis for selecting one of multiple servers to service a request, the invention (e.g., claim 1) recites a replica router configured to “calculate a performance metric value for each of at least two server replicas, the value specifying an estimated communication performance between the client computer and a server replica based upon the client computer’s location in a network; and direct the client computer to at least one server replica that is estimated to provide good performance based upon the client computer’s location in the network based on the performance metric values of the server replicas as calculated by the replica router.”

The claimed invention is unique over the prior art because the replica router receiving the request keeps track of metrics indicating an estimated communication performance between the client computer and a replica server based on a location of the client computer in the network. There is no indication whatsoever in Wallis that the data processing system knows a particular location where the client resides in the network. Moreover, there is no indication in Wallis that the data processing system 10 or any other resource in Wallis generates performance metrics reflecting an ability of

each of multiple replica servers to communicate with the client computer based on the client computer's location in the network. For example, Wallis focuses on internal server parameters such as a current processing load associated with a respective server (e.g., intrinsic operating conditions associated with the servers as discussed above) and not a relative ability of the respective server to communicate with the client depending on the location of the client in the network. Thus, Applicants respectfully submit that the cited reference does not teach every claim limitation.

Applicants respectfully submit that the claimed invention provides utility not taught or suggested by Wallis. One purpose of the claimed invention is to redirect clients to respective replica servers depending on a location of the client in a network. For example, because location of the client is taken into account when generating communication performance metrics, the replica router can redirect a client request to a server that is nearby the requesting client rather than a server far away from the requesting client. This can reduce network traffic and congestion. The cited reference does not address this issue because there is no indication that requests are redirected based on a location of the client computer. Instead, Wallis indicate that redirection to a server depends on whether a server is not heavily loaded serving other requests.

Based on the aforementioned remarks, Applicants respectfully submit that the invention as recited in claim 1 is neither anticipated nor obvious because it includes a unique and useful configuration not taught or suggested by Wallis or any other reference of record. Thus, in view of the foregoing discussion, Applicants submit that claim 1 in its original form is patentably distinct and advantageous over the cited prior art, and the lack of novelty rejection should be withdrawn. Accordingly, allowance of claim 1 as well as corresponding dependent claims 2-5 and 7-9 is respectfully requested.

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Claim 10 includes similar limitations as recited in claim 1 above. For applicable reasons as discussed above, claim 10 and corresponding dependent claims 11-14 and 16-17 are patentably distinct over the cited prior art.

Each of claims 18, 19, 20, 21, 22, and 23 includes similar limitations as recited in claim 1 above. For example, the claims recite directing the client computer depending on a location of the respective requesting client computer in a network. Thus, for applicable reasons as discussed above, claims 18, 19, 20, 21, 22, and 23 are patentably distinct over the cited prior art.

Claims 4 and 5

Applicant thanks the Examiner for clarifying the rejection associated with dependent claims 4-5. The Examiner states that the passages cited to reject claim 1 also disclose the limitations in claims 4 and 5.

Applicant respectfully submits that these dependent claims further distinguish claim 1 over the cited prior art and are not taught or suggested by the passages cited by the Examiner. For example, claims 4 and 5 indicate that "the processor is further configured to calculate a performance metric based on parameters other than those solely associated with the servers. For example, note again that Wallis discloses, as discussed above, use of parameters such as an amount of idle processor time associated with a respective server, number of processes running on a server, the amount of free memory on a server, etc. to determine which server to service a client request. All of these parameters cited in Wallis are limited to a performance associated with only the servers themselves.

In contradistinction to Wallis, the claimed invention as in claim 4 recites a technique of calculating the performance metric based on a description of the client computer's network environment (e.g., parameters other than those associated with the server), not parameters of the server as recited by Wallis. Accordingly, the claimed

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invention recites use of parameters, which are opposite to that of the parameters recited in Wallis. Parameters associated with a server are not equivalent to a description of a client computer's network environment. Thus, Applicant respectfully requests allowance of claim 4.

In contradistinction to Wallis, the claimed invention as in claim 5 recites a technique of calculating the performance metric based on at least one server in a path between the client computer's network environment, not merely parameters of the server as in Wallis. The limitations in claim 5 are opposite to the parameters recited in Wallis, which is limited to using parameters associated with a respective server to determine which server to select for servicing a respective request. Thus, Applicant respectfully requests allowance of claim 5.

For similar reasons, claims 13 and 14 should be in condition for allowance over the cited prior art.

Rejections of Claims under 35 U.S.C. § 103(a)

The Examiner has rejected claim 2 under 35 U.S.C. § 103(a) based on the teachings of Wallis, et al., (U.S. Patent 6,282,569) in view of Brendel, et al., (U.S. Patent 5,774,660). Applicants respectfully submit that are appreciative of the Examiner's review of pending claim 2 and respectfully request further consideration of same in view of the following discussion pointing out why claim 2 is not obvious in view of the cited prior art.

Claim 2 includes limitations that the processor of a replica router is configured to: "receive advertisements from the server replica, the advertisements containing information from which the replica router calculates the performance metric value; and maintain a database of the server replica advertisements."

The office action also indicates that Brendel teaches (at column 6, lines 34-41) the limitation of “receive advertisements from the server replica, the advertisements containing information from which the replica router calculates the performance metric value; and maintain a database of the server replica advertisements.” Applicant respectfully disagrees with this assertion. The cited passage at column 6, lines 34-41 reads as follows:

In further aspects the balancer network node is in the plurality of network nodes containing web servers. The web site is addressable by one network address for all web servers in the plurality of network nodes containing web servers. Each network node in the plurality of network nodes contains only a portion of all the resources at the web site; all resources at the web site are not mirrored to all network nodes at the web site.

The above passage merely recites a configuration or characteristics associated with a balancer network node and corresponding website that happens to be addressable by a respective address. In contradistinction, the claimed invention recites a technique of receiving advertisements from replica routers. The advertisements contain information from which the replica router calculates a performance metric value. Brendel does not recite use of any replica routers. Nor does Brendel recite that a replica router receives advertisements used to generate performance metric values.

Claim 3 includes limitations that the processor is configured to: “match the replica advertisements to their actual source IP address where each of the replica advertisements contain the actual source IP address of the server replica; and determine whether any of the server replicas are located behind firewalls.”

Applicants respectfully submit that the cited passages by the Examiner do not teach or suggest the invention as in claim 3. For example, to reject claim 3, the Examiner cites column 20, lines 17-25, which reads as follows:

Each server can process requests from multiple clients, especially when multitasking operating systems such as UNIX and Windows NT are used. While a connection through the public Internet has been described, the connection could also be made through private networks such as corporate networks known as Intranets. Intranets are just a subset of the larger Internet. Thus the web site could be behind a corporate firewall and not be visible to the users of the Internet.

This passage merely recites that the proxy server described by Brendel can process multiple requests and be located behind a corporate firewall. A mere “presence” or “existence” of a server (in Brendel) behind a firewall does not teach or suggest the claim limitation of “determining whether any of the server replicas are located behind firewalls.” More specifically, the claimed invention recites a replica router includes a processor configured to determine whether any replica servers are located behind a firewall. The cited passage is neither equivalent nor suggestive of the limitations in claim 3.

Moreover, the cited passage does not teach or suggest the claim limitation of “match the replica advertisements to their actual source IP address where each of the replica advertisements contain the actual source IP address of the server replica.” There is no matching performed in the cited passage.

Also, note that Brendel is directed towards a proxy server while Wallis provides direct feedback to the requestor of a specific server to retrieve a document. Thus, the cited references are not combinable to teach the claimed invention.

For similar reasons as discussed above for claims 2 and 3, respective claims 11 and 12 are patentable over the cited prior art.

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CONCLUSION

In view of the foregoing remarks, Applicants submit that the pending claims are in condition for allowance. A Notice to this affect is respectfully requested. If the Examiner believes, after reviewing this Response, that the pending claims are not in condition for allowance, the Examiner is respectfully requested to call the Applicant(s) Representative at the number below.

Applicants hereby petition for any extension of time, which is required to maintain the pendency of this case. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50-3735.

If the enclosed papers or fees are considered incomplete, the Patent Office is respectfully requested to contact the undersigned Attorney at (508) 616-9660, in Westborough, Massachusetts.

Respectfully submitted,



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